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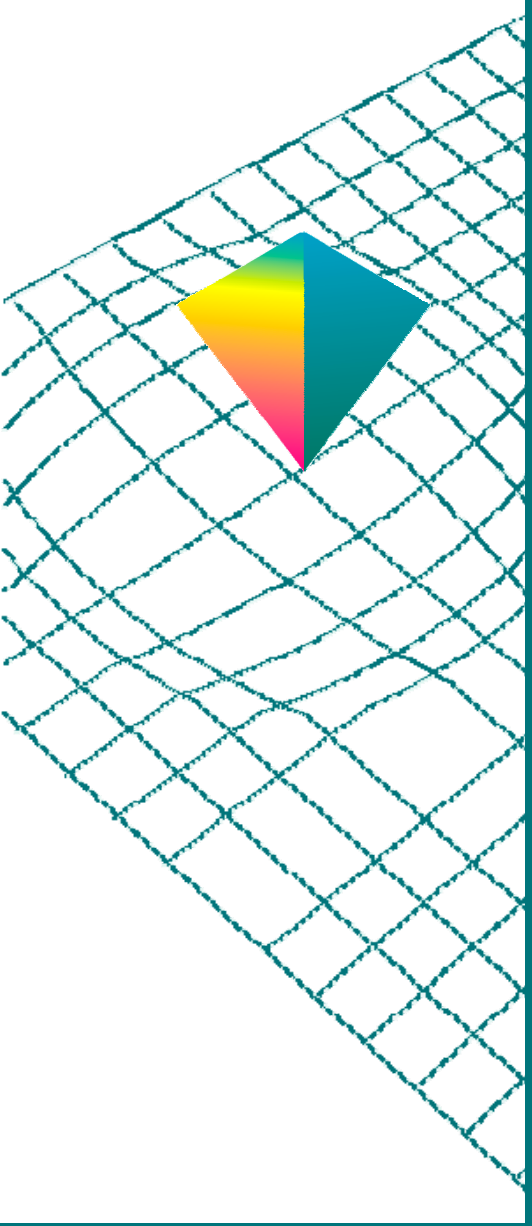

Maschinenbau von Makro bis Nano / Mechanical Engineering from Macro to Nano

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B. Hocken

Engineering Nanotechnology at UNC Charlotte

Nanotechnology can be defined as "the study, development and processing of materials, devices, and systems in which structure on a dimension of less than 100 nm is essential to obtain the required functional performance."

There are currently two very different approaches to nanotechnology, the first and more classical approach is commonly called engineering nanotechnology. This approach involves using classical deterministic mechanical and electrical engineering principles to build structures with tolerances at levels approaching a nanometer. The other approach, sometimes called molecular nanotechnology is concerned with self-assembled machines and the like and is far more speculative.

At Charlotte's Center for Precision Metrology we have been working in engineering nanotechnology for more than a decade. We started with molecular manipulation with scanning probe microscopes in the late 1980s and have continued to develop new measurement systems, nano-machining systems and nano-positioning devices.

In this talk I will describe our work in nano-cutting, nano-positioning with the Sub-Atomic Measuring Machine (SAMM), sensing with Near-field Scanning Optical Microscopes (NSOMs), and a new machine we are building for nanoimprinting. I will conclude with some comments on future challenges in nanotechnology and nanometrology.

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